

be immediately vaporized by contact with the hot walls of the ribs 12. The vapors thus produced are divided into two streams one of which is caused to enter each of the branch passages at one side of the casing and the other of which is caused to enter each of the branch passages at the opposite side of the casing. The two vapor streams merge as they pass around the final baffle and enter the conduit 17 but are again divided and heated in a similar manner as they flow through the casing 9. Each of the vapor streams is constantly in contact with the highly heated walls of the ribs 12. In their passage through the casings 8 and 9, therefore, the vapors are heated to such a degree that a dry highly vaporized gas is produced. In this connection it will be noted that the vaporizing chambers are maintained under a vacuum and that vaporization is effected in the absence of air. Conversion of the liquid into highly expanded vapors is thus insured. The flow of the exhaust gases through the casings 8 and 9 is counter to that of the vapors. The latter, therefore, are heated in stages and are introduced into the mixing chamber 20 when at their highest temperature.

The air which is mixed with the fuel vapors enters the pipe 21 after passing through a conventional filter 36, the amount of air entering the said pipe being regulated by a valve 37. The invention contemplates the heating of the air prior to its entry into the mixing chamber 20. To this end a jacket 39 is formed or provided around the pipe 21. The said jacket provides a chamber 40 which communicates with the chamber 32 of the casing 9 through an inlet pipe 41 and with the corresponding chamber of the casing 8 through an outlet pipe 42. A portion of the exhaust gases is thus caused to pass through the chamber 40 to heat the air as it passes through the conduit 21 on its way to the mixing chamber, the valve 37 being connected to the valve 23 by arms 43 and 43a and a link 44 so that the volume of air admitted to the mixing chamber is increased proportionately as the volume of vapors is increased. As the fuel vapors and air are both heated to a high temperature and are in a highly expanded state when they enter the mixing chamber they readily unite to provide a uniform mixture, the use of a carburetor or similar device for this purpose being unnecessary.

From the foregoing it will be apparent that the components of the fuel mixture are separately heated prior to their entry into the mixing chamber 20. As the vapors which are produced are dry and highly expanded complete combustion is insured. The potential energy represented by the said vapors may thus be fully utilized, thereby insuring better engine performance and a saving in fuel consumption. At the same time the formation of carbon in the combustion chambers and the production of carbon monoxide and other objectionable exhaust gases are prevented. The device has the further advantage that, owing to the high temperature to which the fuel is heated prior to its admission into the combustion chambers, various inferior and inexpensive grades may be employed with satisfactory results.

I claim as my invention:

1. A device of the character described including a casing, a vaporizing chamber in said casing which is connected to the intake manifold of a combustion engine and into which a liquid fuel is introduced, an inlet chamber at one side of said vaporizing chamber into which exhaust gases

from said engine are introduced, an outlet chamber at the opposite side of said vaporizing chamber into which said exhaust gases are discharged, a plurality of substantially parallel series of ribs which define tortuous paths through said vaporizing chamber and which are formed to provide cells, the cells of one of said series of ribs communicating directly with said inlet chamber while the cells of a second of said series of ribs communicate directly with said outlet chamber, a connecting chamber with which the cells of both of said series of ribs communicate, said inlet chamber, outlet chamber and connecting chamber providing a path for the exhaust gases which extends transversely with respect to said series of ribs, a mixing chamber to which the vapors produced in said vaporizing chamber are conducted and means for introducing air into said last named chamber to provide a fuel mixture having the proper proportions of each component.

2. A device of the character described including a vaporizing chamber which is connected to the intake manifold of a combustion engine and into which a liquid fuel is introduced, a plurality of substantially parallel series of hollow ribs, the ribs of each series being spaced from one another and from the ribs of an adjacent series to provide main and branch passages, baffles which are arranged in said passages and which provide two tortuous paths, means for causing exhaust gases from said engine to simultaneously enter all of the ribs of one of said series and thereafter to simultaneously enter all of the ribs of the adjacent series, whereby to heat the walls of said passages to convert said fuel into vapors, said baffles causing one part of the vapors to traverse one of said paths and a second part to traverse the second of said paths, a mixing chamber to which the vapors thus produced are conducted and means for introducing air into said last named chamber to provide a fuel mixture having the proper proportions of each component.

3. A device of the character described including a casing, a vaporizing chamber in said casing which is connected to the intake manifold of a combustion engine and into which a liquid fuel is introduced, a cover plate for said vaporizing chamber, a plurality of substantially parallel series of hollow ribs, the ribs of each series being spaced from one another and from the ribs of an adjacent series to provide main and branch passages, baffles carried by said cover plate, said baffles being supported in said passages and providing tortuous paths, means for causing exhaust gases from said engine to simultaneously enter all of the ribs of one of said series and thereafter to enter all of the ribs of an adjacent series, whereby to heat the walls of said passages to convert said fuel into vapors, a mixing chamber to which the vapors thus produced are conducted and means for introducing air into said last named chamber to provide a fuel mixture having the proper proportions of each component.

4. A device of the character described including a casing, a vaporizing chamber in said casing which is connected to the intake manifold of a combustion engine and into which a liquid fuel is introduced, a cover plate for said vaporizing chamber, a plurality of substantially parallel series of hollow ribs, the ribs of each series being spaced from one another and from the ribs of an adjacent series to provide main and branch passages, baffles carried by said cover plate, said baffles being supported in said passages and providing two tortuous paths, means for causing ex-